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A New Kingsnake (Genus *Lampropeltis*) From Florida

By Wilfred T. Neill and E. Ross Allen

The kingsnake of the Chipola and Apalachicola River valleys (in the Florida Panhandle) differs widely from all previously described forms. We propose to name it in honor of Dr. Coleman J. Goin, who has contributed so extensively to our knowledge of the Florida herpetofauna.

LAMPROPELTIS GETULUS GOINI new subspecies

TYPE WTN No. 19211; adult male collected May 5, 1949.

TYPE LOCALITY. Chipola River valley at Wewahitchka, Gulf County, Florida.

PARATYPES, WTN No. 19212, Chipola River valley at Wewahitchka, Gulf County, Florida, June 10, 1949; WTN No. 19213, Chipola River valley at Scott's Ferry, Calhoun County, Florida, June 29 1949; WTN No. 19214 Apalachicola River valley in Gulf County, Florida, August, 1946. Other specimens have been examined but not designated as paratypes; see under "Remarks".

DIAGNOSIS. Light transverse bands reduced in number (1 on the nape, 15 to 17 on the body, 5 or 6 on the tail). Light bands very wide, covering the length of 4 to 8 scales dorsally, and further widening on the sides. Each scale of the light bands light on its anterior half but dark on its posterior half. Dark ground color, between the light bands, formed by deep brown scales, each bearing a vaguely defined light spot. Venter rich brown with light streaks on the ends of the ventrals, groups of these streaks roughly alternating from side to side of the abdomen. A wide light band crossing the back of the head; remaining light head markings, except those of the labials, reduced to narrow lines or dots.

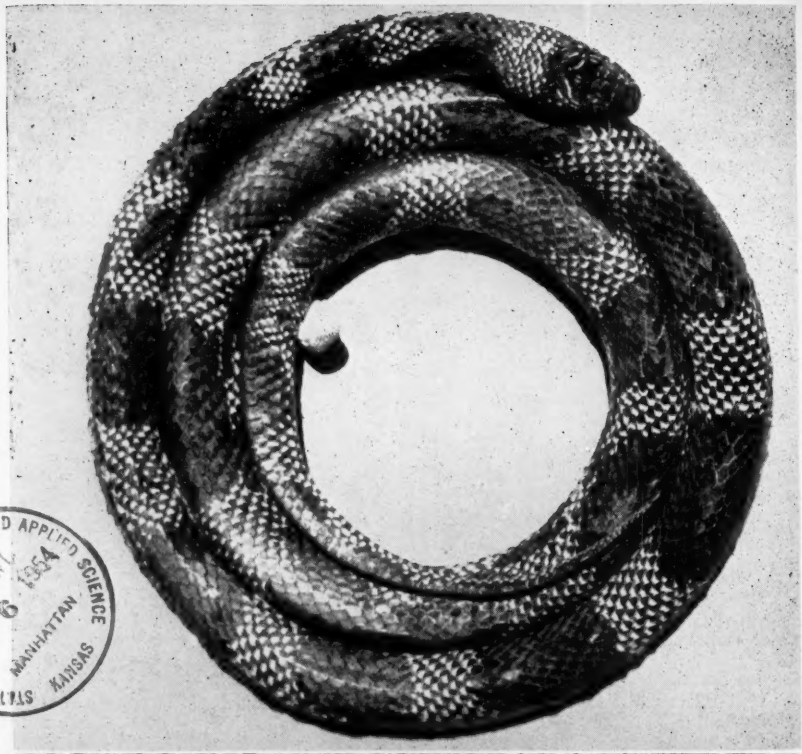
DESCRIPTION OF TYPE. Rostral, internasals, prefrontals, frontal, supraoculars, parietals, and chin shields normal. Loreal higher than long. Preoculars 1, postoculars 2. Temporals 2-3-4. Supralabials 7, the 6th largest, the 3rd and 4th subocular. Infralabials 9, the 1st meeting its fellow of the opposite side just behind the mental, the 5th largest.

Scales smooth, in 21 rows, decreasing to 19 rows by the loss of the 5th row at about the level of the 164th ventral. Ventrals 212; anal single; subcaudals 54, divided; tail terminating in a slender spine.

Form moderately slender, cylindrical. Head length 39 mm, snout-vent length 1105 mm, tail length 173 mm.

Light transverse bands 1 on the nape, 17 on the body, and 5 on the tail, each covering the length of 4 to 7 scales dorsally, and further widening on the sides. In life, each scale of the light bands yellow-white on its anterior half and black on its posterior half, the line of demarcation between the two colors being sharp. Ground color, between the light bands, formed by rich brown scales, each scale with a vaguely defined light spot on its anterior half, these spots more evident laterally. Venter rich brown with yellow streaks on the ends of the ventrals, groups of these streaks roughly alternating from side to side of the abdomen. Sides of the body with narrow, interrupted lines, formed by yellow spots on the scales of the 2nd and 3rd, and of the 3rd and 4th, scale rows. Tail with a sublateral yellow line along its entire length. A wide band of yellowish spots crossing the back of the head. Each labial, of both upper and lower series, with a

*Corrected Nov. 7, 1949



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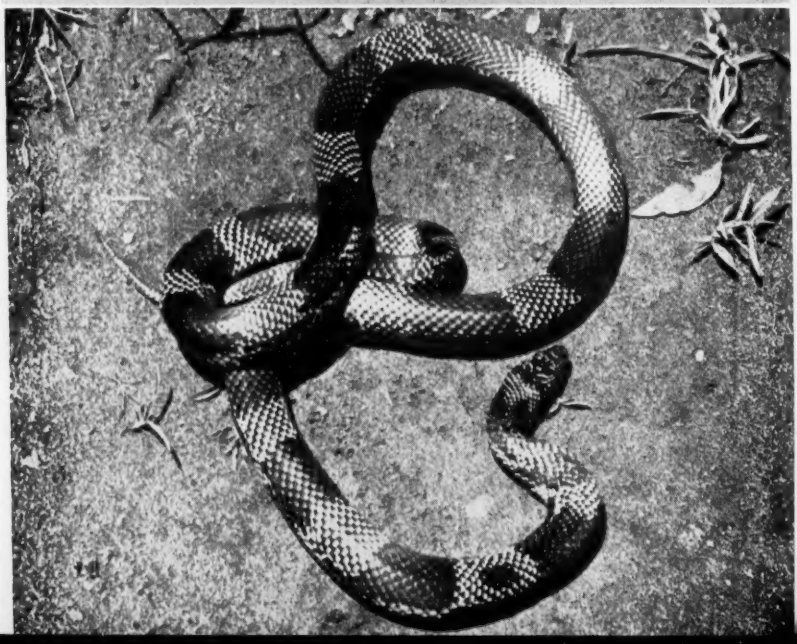

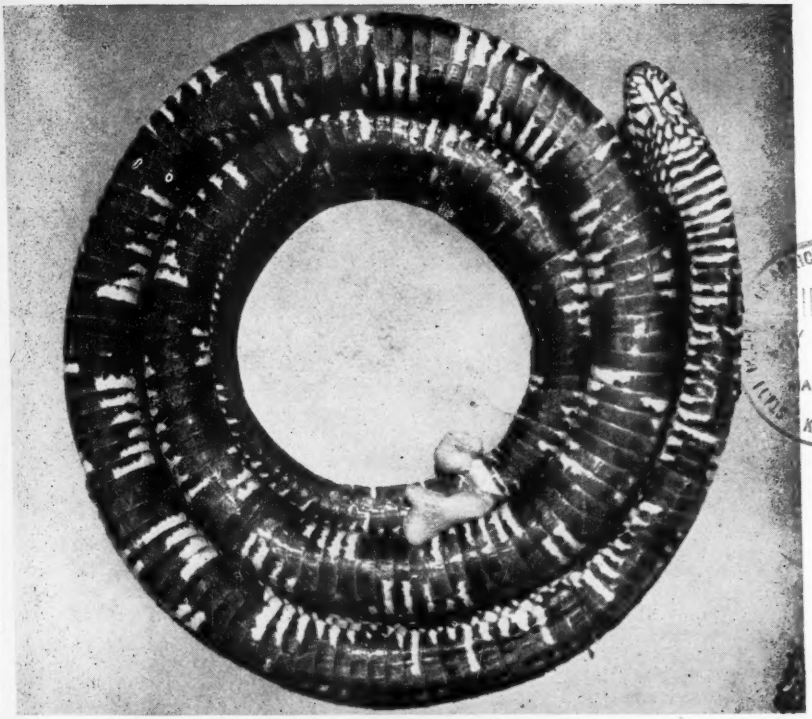

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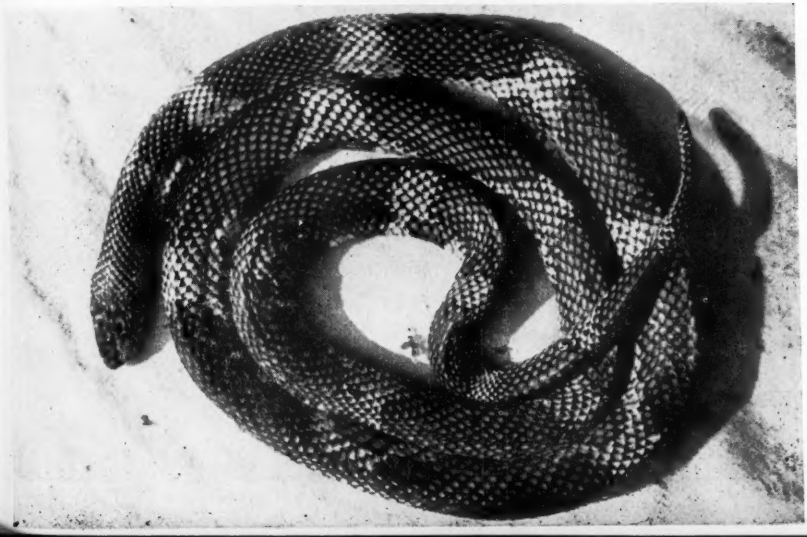
Fig. 1. Preserved type, dorsal view. (above, left)
Fig. 2. Preserved type, ventral view. (above)
Fig. 3. Type, in life. (below, left)
Fig. 4. WTN No. 19213 (paratype). (below)



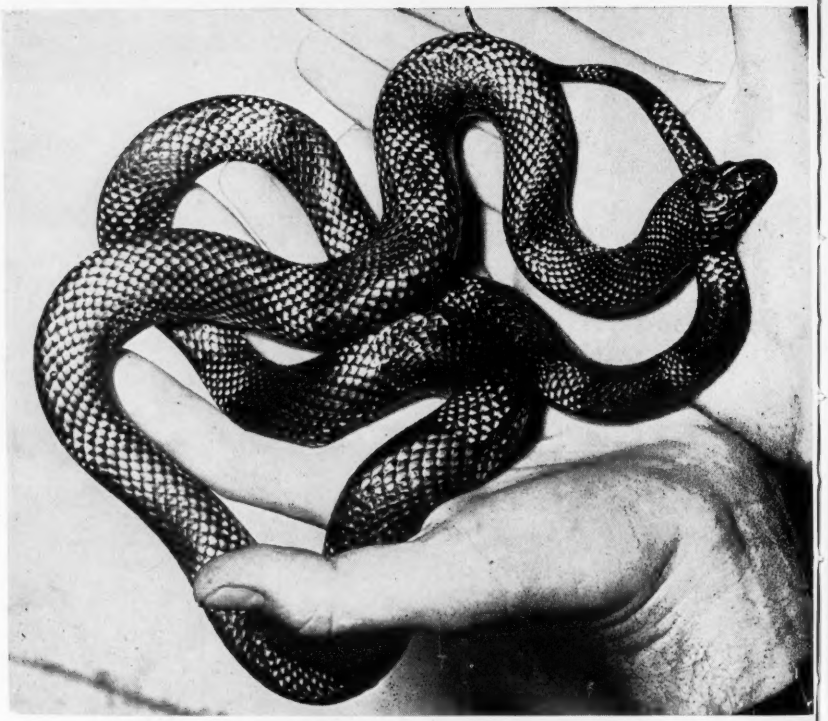
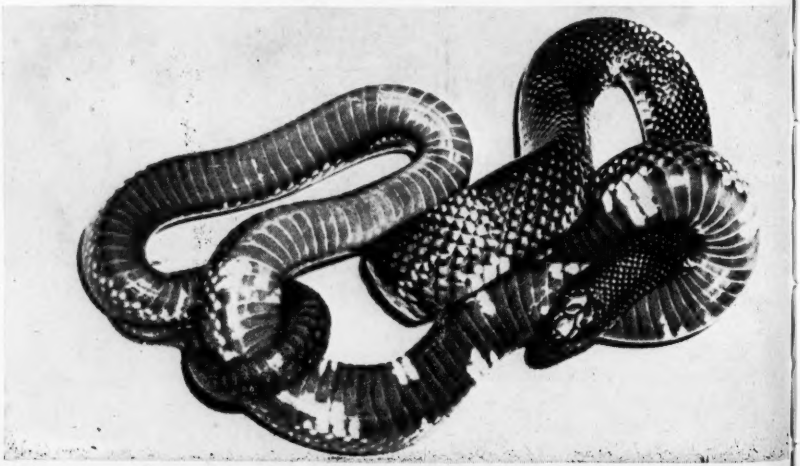


Fig. 5. Apalachicola River in Gulf County, Florida. Specimen not available. (above)
Fig. 6. Apalachicola River in Gulf County, Florida. The ventral light markings are very restricted. Specimen not available. (below)



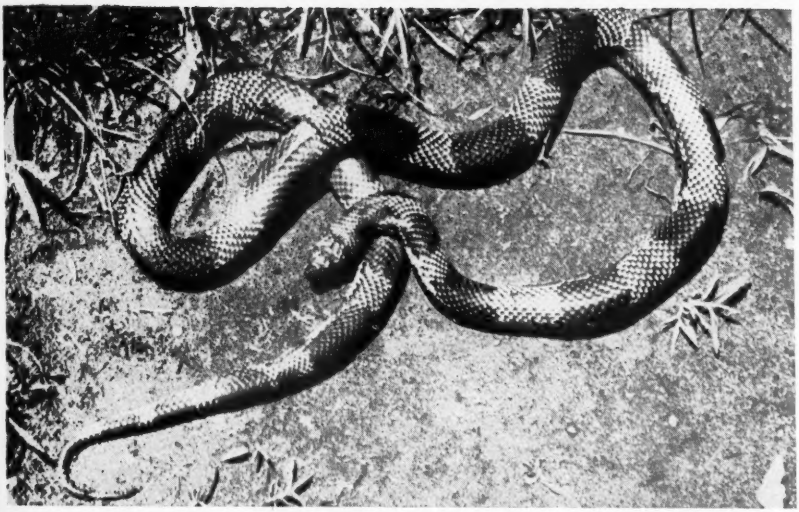
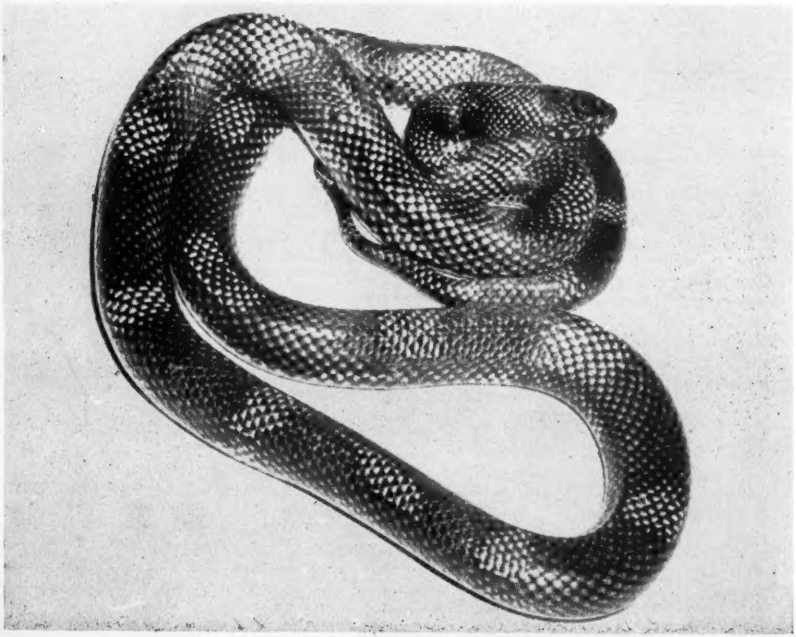


Fig. 7. A topotype. The light bands are unusually ring-like. Specimen not available. (above)

Fig. 8. Apalachicola River in Gulf County, Florida. The light bands are restricted mainly to the dorsal region. Specimen not available. (below)



large upright spot of yellowish-white; remaining light head markings, involving all cephalic scutes except the rostral, in the form of narrow lines or dots of yellowish-brown. Ground color of head, above, black. Chin and throat yellow, all the scales black-margined; first 10 ventrals yellow, each margined posteriorly with dark brown.

Hemipenis forked; sulcus single, extending over the side of the larger fork; a small bare space at the apical end, surrounded by low calyces; fringes few, developing rapidly into spines which increase in size to about half the distance to the base, then stop abruptly; remainder of organ smooth.

VARIATION. The chief pattern variations are shown in the accompanying photographs. In all specimens examined, the scale row count was 21-19. In No. 19212, a female, the ventrals number 214; the tail tip is missing and no subcaudal count can be made. In No. 19213, the ventrals number 216; the tail tip is missing; the anal is divided. In No. 19214, a female, the ventrals number 216, the subcaudals 53.

RANGE. The Apalachicola and Chipola River valleys, in the Florida Panhandle. We have seen specimens only from Gulf and Calhoun countries.

AFFINITIES. Apparently the range of **goini** is completely surrounded by that of typical **getulus.** We have examined many **getulus** from Calhoun, Wakulla, Jefferson, and Escambia counties, Florida. Even the Calhoun County **getulus** showed little approach to **goini.** However, the latter is evidently a member of the **getulus** complex, and we think it likely that intergrades will be found eventually. Thus the new form has been given subspecific rank.

The Apalachicola and Chipola River valleys support a remarkable number of endemic plants and animals, such as Florida yew, **Taxus floridana;** stinking cedar, **Tumion taxifolium;** the camel-crickets, **Ceuthophilus umbrosus** and **C. rogersi;** the rare katydid **Hubbellia marginifera;** the wingless grouse-locust **Tettigidea empedonepia;** the peculiar opilionid **Siro americanus**; the saw-back turtle **Graptemys barbouri,** etc. Most or all of these are generally considered to be relict forms, and so we are inclined to consider **L. g. goini.**

REMARKS. In addition to the type and paratypes, we have seen 5 other specimens of **goini.** These we could not secure from the collectors. However, several were photographed, and the collecting data were procured. We append some of these photographs, along with those of certain specimens in our possession. DEPARTMENT OF BIOLOGY, AUGUSTA JUNIOR COLLEGE, AUGUSTA, GEORGIA and SILVER SPRINGS, FLORIDA.

Vertical Position of the Pupil in the Crotalidae

by D. F. Munro

The vertical pupil of the pit viper is usually likened to that of the cat. As in the case of the latter animal, the snake's pupil dilates with decreasing illumination; again like the cat's, it dilates even under strong illumination when the animal is frightened, excited, or angry. But there is one ability of the reptilian eye which is not duplicated in the feline. That is the tendency of the pupil to remain in a vertical position, regardless of the movement of the head.*

Of course, cat and snake differ greatly in the position of the eyes relative to the head: in the cat, the eyes are on the anterior surface, in the snake, on the two lateral surfaces. It requires therefore quite different movements of the two sorts of heads to throw their respective pupils out of the vertical: for the cat, rotation about the cat's longitudinal axis (producing sidewise tilt); for the snake, rotation about a horizontal line at right angles to the longitudinal axis (tilting of the nose up or down).

If a cat's head be tilted to one side, or when the cat itself, as in eyeing prospective prey or a plaything, sometimes tilts its head, thus throwing the axis of symmetry away from the vertical, the observation can be made that the position of the pupil has not altered relative to the head. In other words, the cat's pupil does not independently maintain a vertical position when the head tilts.

In the case of the pit viper, on the other hand, the pupil remains vertical when the nose is pointed up or down through large angles; the eyeball rotates in its socket and compensates for the movement of the head.

An attempt was made to photograph the head of a 4-year-old **Agkistrodon contortrix mokeson** (captured in infancy at Fort Leavenworth, Kansas) at the maximum angles which still left the pupil vertical. However, it was found that even in the case of this very mild-tempered individual the experimental conditions were disturbing enough to prevent the recording of angles as great as those seen when the snake is at ease in its cage (an unfavorable situation for photography); the snake exceeds the photographed tilts by small amounts before reaching angles beyond which the head does not tilt without forcing the pupil out of the vertical. (A **Sistrurus miliarius streckeri** climbing up against a window screen with nose virtually straight up was seen to keep the pupil vertical.)

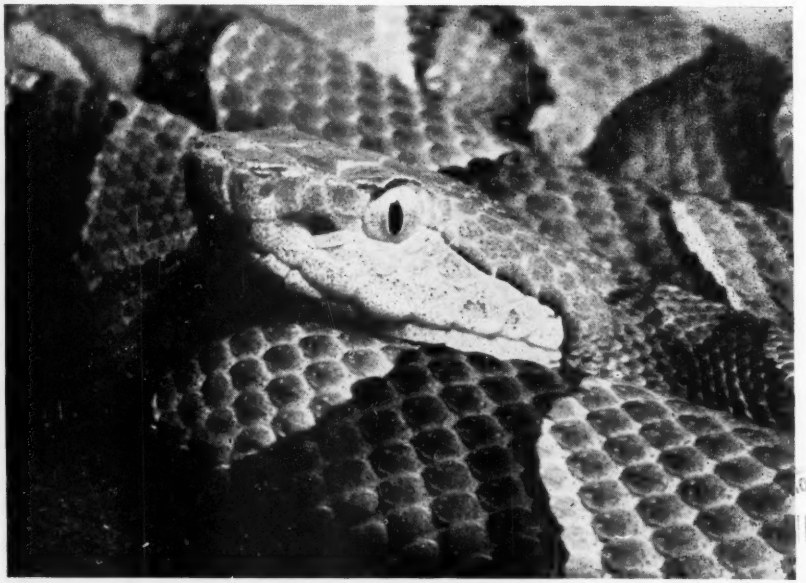


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Fig. 1. Agkistrodon contortrix mokeson. Photo by D. W. Quackenbush.

Results obtained with the Copperhead are shown in the accompanying illustrations:

Fig. 1 Normal resting position — chin cushioned on a loop of the body, the neck dropping down behind, thus tilting the head up at varying angles, ordinarily some 20°; the pupil remains vertical.

Fig. 2. Frequently attained angle of elevation of nose, with pupil still vertical; the drawing is based on photographs with a plumb line in the background and on very many observations in positions where the wires of the cage-front served as coordinates for checking the angles.

Fig. 3. Occasionally attained angle of depression of nose, with pupil still vertical.

The dotted lines joining **Figs. 2** and **3** are intended to show the amplitude of accommodation. If the line of the mouth be taken as reference, even though it is not necessarily parallel to the horizontal of the snake's customary or "average" position, it is clear from the illustrations that the head can be tilted through an angle of at least 65° while the pupil remains vertical. Though the exact horizontal plane of the head is not easily determined, the actual tilt of the head is obviously some degrees above that indicated by the line of the mouth. It is evident also that the pupil maintains its vertical position through a larger tilt upward than downward. This could be foreseen, because a terrestrial snake ordinarily has little

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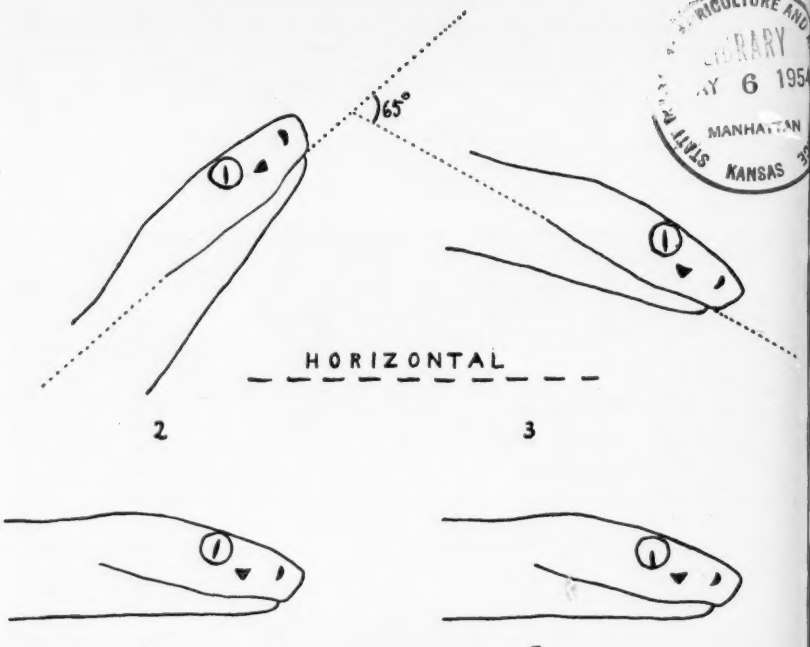

occasion to tilt its head down at any other than a small angle, and hence the ability to orient the pupil is less developed in that direction. In this connection it would be interesting to compare the pupil-movement of **Leptodeira septentrionalis,** which is said to be arboreal nocturnally and hence might often be above its prey.

Two other observations on the position of the pupil might appropriately be mentioned here.

When the snake, at ease in the cage, after lying with its head tilted up, slowly lets the chin come to rest on the floor, the pupil is often seen to have kept the earlier orientation with respect to the head, and now has the appearance of **Fig. 4.** This is a position resulting when the snake apparently has nearly dozed off. Any attempt to photograph the snake in this attitude caused it to rouse, whereupon the pupil resumed the vertical position immediately.

Another peculiar position of the pupil results when the snake obviously is sound asleep. Complete relaxation seems to permit the orb to rotate outward and downward so that the lower end of the pupil disappears behind the lower edge of the ocular; the upper end is correspondingly some distance below its usual location **(Fig. 5);** often the upper edge of the iris shows. This position gives the snake a curiously introvert expression.

Because it is so well developed, the pit viper's ability to maintain a vertical pupil presumably has an important bearing on the adaptation for distance by the lens, as well as on the stereoptical effect in perception by the eyes jointly; both of these aspects of vision are vital to the venomous reptile, which can strike its active prey properly only by carefully estimating the distance. More important still, perhaps, is the necessity of the snake's taking into account the direction of gravity relative to the direction of the proposed hurling of a considerable part of its body: the eyes thus act, as it were, like gyroscope controls, ensuring accurate strikes.

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*This note is the result of a suggestion by Major Chapman Grant.